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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/787,364	05/29/2001	Kousuke Suzuki	108946	8179

25944 7590 07/17/2003

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[REDACTED] EXAMINER

KIM, PETER B

ART UNIT	PAPER NUMBER
2851	

DATE MAILED: 07/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/787,364	SUZUKI, KOUSUKE	
	Examiner	Art Unit	
	Peter B. Kim	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 March 2003.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-8 and 10-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 1-8, 10, 11, 25, 33 and 34 is/are allowed.
- 6) Claim(s) 12-19, 22-24, 26-28, 31, 32, 35, 38, 39, 41 and 42 is/are rejected.
- 7) Claim(s) 20, 21, 29, 30, 36, 37 and 40 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's arguments filed on Mar. 20, 2003 have been fully considered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 12-14, 17-19, 22-24, 26, 31, 32, 35, 38, 39, 41 and 42 are rejected under 35 U.S.C. 102(a) as being anticipated by Shinonaga et al. (Shinonaga) (5,838,426).

Shinonaga discloses an exposure method and apparatus comprising a illumination optical system (27, 28, 29), a projection optical system (7), wavelength adjusting device (32), an image formation characteristic measurement system (col. 10, lines 43-60, detecting changes in focusing). A control system (ref. 15, 13, 17, 31, 32, 16, 22, 18, 14, 19, 20, 21), connected to the wavelength adjusting device and the image formation characteristics measurement system (Fig. 1), changing at least one condition of illumination condition by changing a wavelength of illumination light for illuminating the pattern on the first surface (1) (col. 6, lines 13-39), and detecting a change amount of image formation characteristics of an image projected on to the second surface (9) via the projection optical system (7) (col. 10, lines 43-60), detecting changes in focusing), and determining a predetermined relationship between a change amount of installation environment of the projection optical system and the change amount of the image formation characteristics for each condition based on a result of the detection, and a memory (23) connected to the control system (col. 9, lines 25-55, and col. 10, lines 43-60, storing in memory

the amount of change in relative refractive of air based on change in pressure, and the change in focus position). Shinonaga discloses an installation environment measuring system for measuring and determining a change amount of the environment (22, 19, 21, 20), and changing a wavelength of the illumination light according to the change amount installation environment (col. 9, lines 25-55). Besides the first technique for adjusting the image formation characteristics by changing the wavelength, Shinonaga also teaches changing the image formation characteristics (change in focusing) by correcting the focus position of the wafer (col. 10, lines 48-60). Shinonaga discloses in col. 4, line 57 – col. 6, line 29, the preparation operation for projecting the image of the pattern. Shinonaga also discloses the method and the apparatus wherein the change amount of the environment is the difference between the measure and reference environment (col. 10, lines 61-67), and the change amount of the image formation characteristics is caused by change in wavelength (col. 10, lines 48-60). Shinonaga also discloses the projection optical system made of plurality of glass (col. 11, lines 64-67), and providing gas supplied inside the projection optical system and the change in environment is the change of atmospheric pressure (col. 9, lines 7-62).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 15, 16, 27, are 28 rejected under 35 U.S.C. 103(a) as being unpatentable over Shinonaga et al. (Shinonaga).

Shinonaga discloses the claimed invention as discussed above, however, Shinonaga does not disclose changing of the wavelength of light according to the installation environment of the relocated location in advance when assembling the projection optical system at a location different from the installation environment. Shinonaga also does not disclose transferring the device pattern onto a work piece using the exposure method. Although Shinonaga does not disclose different installation environment or assembly location, since Shinonaga teaches storing in memory amount of change in refractive index according to change in pressure and accommodating the change by controlling the wavelength, it would have been obvious to one of ordinary skill in the art to adjust the wavelength upon determination of the installation environment to properly set the wavelength at the assembly location, and to carry out the pattern transfer once the apparatus is installed.

Also, although Shinonaga does not disclose holding the environment of the optical system constant during the change of the wavelength, adjusting of the projection optical system, and a second adjustment for controlling the pressure inside the optical system in the embodiment of Fig. 1, in the embodiment of Fig. 4, Shinonaga discloses holding the environment constant, adjusting the projection optical system and controlling the pressure inside the optical system (col. 11, lines 6-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to provide the technique of adjusting the wavelength and the technique of adjusting the optical system together because having two techniques would lend to more flexibility and accurate adjustment according to the changes in the environment.

Allowable Subject Matter

Claims 1-8, 10, 11, 25, 33, and 34 are allowed.

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Claims 20, 21, 29, 30, 36, 37, and 40 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the prior art of record teaches or discloses controlling the formation characteristics measurement to system to measure a change amount of the image formation characteristics while changing the wavelength and determining a predetermined relationship between a change amount of the installation environment of the projection optical system and the change amount of the image formation characteristics based on the measurement results for the each condition.

None of the prior art of record teaches or discloses an exposure method or apparatus with a first and second image formation characteristic adjustment where the second technique is applied when the first technique could not completely make the correction or when the change amount of the change in the environment is greater than a predetermined value.

Response to Arguments

Applicant argues that Shinonaga does not teach changing a wavelength according to the change amount of the installation environment while the exposure apparatus is executing a preparation operation. Since, Shinonaga teaches changing the wavelength according to the change in the amount of installation for the exposure before the actual start of the exposure, Shinonaga teaches changing a wavelength during the preparation operation.

Applicant argues that Shinonaga does not teach selecting at least one of the first and second technique. Besides the first technique for adjusting the image formation characteristics by changing the wavelength, Shinonaga also teaches changing the image formation

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characteristics (change in focusing) by correcting the focus position of the wafer (col. 10, lines 48-60). Shinonaga teaches using one of the two techniques to make the correction.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter Kim whose telephone number is (703) 305-0105. The examiner can normally be reached on Monday-Thursday from 8:30 AM to 6:00 PM. The examiner can also be reached on alternate Fridays during the same hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams can be reached on 703 308 2847. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9318 for regular communications and 703 872 9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 306 3431.



Peter B. Kim
Patent Examiner
July 15, 2003



RUSSELL ADAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800